

REMARKS

Reconsideration and allowance in view of the foregoing amendments and the following remarks is respectfully requested.

Claim amendments/Status

The claims are maintained without amendment. Claims 16-23, 25 and 30-39 therefore remain pending in the application.

Rejection under 35 USC § 103

The rejection of claims 16-21, 23, 25, 30, 31-36, 38 and 39 under 35 USC §103(a) as being unpatentable over Pourquier WO 03/019669 (hereafter Pourquier 669) (original and translation provide) as evidenced by Pourquier U.S. 6,960,483 B2 (hereafter Pourquier 483- prior art of record) in view of Blanchard et al. (U.S. 6,621,107 B2), is respectfully traversed.

Claim 16 is rejected on the ground of obviousness in respect of Pourquier '669 and Blanchard '107.

Applicant believes that the Examiner has mischaracterized Pourquier as well as Blanchard in order to reach this obviousness conclusion.

Firstly, contrary to what the Examiner indicates, Pourquier does not disclose "*wherein said trenches comprise a series of trenches (FIG. 4) located under the contact pad (54 and 56 in FIG. 5)*". Rather, there is only one trench in Pourquier, not a series of trenches, under one pad (viz., under each pad). The invention as claimed in claim 16 is directed towards a process for forming a more efficient contact pad than in the prior art, and one feature in claim 1 is that one contact pad should be connected to a series of narrow trenches located below the pad, said trenches filled with a conductive material. Pourquier has no such series of filled trenches under one contact pad.

Furthermore, the Examiner states that Pourquier discloses "*filling the space opened by said trenches with a conducting material isolated from the active layer*". However, this is not true because Pourquier does not fill the space in the trench; rather, it provides a coating on the sides and bottom of the trench, which is not filling the space in the trench as described and drawn in the specification and claims of the instant invention.

The Examiner notes that Pourquier fails to disclose etching at least one contact pad in said metal layer, and narrow, parallel, vertical trenches. Indeed this is because Pourquier has a

very different manufacturing process for building a contact pad.

The contact pad of Pourquier needs no etching of a contact pad from the backside; therefore Applicant believes that no prior art could be combined with Pourquier to suggest etching a contact pad since Pourquier needs no such etching.

The Examiner uses Blanchard to combine with Pourquier to render claim 16 obvious. However, Blanchard discloses no contact pad building at all. Therefore, it is believed that Blanchard cannot provide any suggestion for improving the process of manufacturing a contact pad.

Blanchard shows trenches, however these trenches could not be used to form conductive vias between the front face and the backside of a thinned wafer as claimed in claim 16. The trenches of Blanchard should in no way be traversing for the reason that they are intended to contact the semiconductor to make a Schottky diode.

It is submitted that no Schottky diode would be possible if the trench was a traversing trench. For these reasons, it would make no sense for the hypothetical person of ordinary skill in the art to look into Blanchard to improve the building of a contact pad with traversing conducting vias.

The rejection states that *"it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the narrow, parallel, vertical trenches and etching at least one contact pad in a metal layer of Blanchard et al for the trenches and metal layer of Pourquier,"* However, this overlooks that this substitution could only lead to and have the purpose of building Schottky diodes, whereas Schottky diodes are not desired in Pourquier and would, instead of improving a contact pad, clearly prevent a contact pad from being formed.

For these reasons, it is believed that a combination of Pourquier '483 and Blanchard '107 does not render obvious the invention claimed in claim 16.

Regarding independent claim 31, it is respectfully submitted that the Examiner has mischaracterized Pourquier when stating that *"said trenches (FIG. 5) comprise a continuous trench completely surrounding a semiconductor region (the trenches in FIG. 5 surround a region of semiconductive wafer 10) below said contact pad (56 in FIG. 5)"*. Rather, the trenches seen on the figures of Pourquier on each side of an active area ZA are different trenches, each corresponding to a different contact pad. If it were a single continuous trench, then there would be only one contact pad in the device. No electronic device, whether or not an image sensor as is the case in Pourquier, can operate with a single contact pad. In addition to that obvious remark, the specification in Pourquier is clear, with the systematic use of plural ("the connection

pads 22"), that 22 designate several pads, not a single continuous closed loop pad.

In addition to the above, it is clear that Pourquier does not teach a continuous trench surrounding a semiconductor region below the contact pad, since even if (*arguendo*) trench 22 of Pourquier were a continuous trench surrounding a semiconductor region, which is definitely not, then the semiconductor region would not be below the contact pad, as claimed in claim 31. Rather the contact pad would be outside the surrounded semiconductor region.

Furthermore, the contact pad would not be connected 'through' said semiconductor region. Rather it would be connected 'outside' the semiconductor region. Moreover, the contact pad would not be isolated from the conductive material filling said continuous trench as claimed in claim 31. Rather the contact pad of Pourquier is formed of the conductive material coated on the trench walls and bottom.

In respect to the second paragraph page 10 of the Office action, where the Examiner discusses Blanchard, Applicant submits that Blanchard is mischaracterized in that it would disclose the contact pad (218) is isolated (oxide 216 in FIG. 5) from the conductive material filling (polysilicon 211) said continuous trench. There is no continuous trench in Blanchard. Furthermore, the conductive material filling said continuous trench in claim 31, is a material for forming conductive vias, where polysilicon 211 in Blanchard cannot form a conductive via and therefore cannot be interpreted as being the conductive material of the claimed invention.

The subject matter of claim 31 is directed to covering the process of formation of a contact pad as drawn in figures 11 and 12. Applicant believes that there is no suggestion in either of Pourquier or Blanchard that would lead to building such a contact pad structure. The assertions in the Office action that it would have been obvious to use features of Blanchard in Pourquier, are submitted as being made without consideration to the overall process for forming contact pads as claimed in claims 16 or 31, so that only ex-post considerations are used to try to individually anticipate such or such step of the overall process.

Conclusion

All objections and rejections having been addressed, it is respectfully submitted that the present application should be in condition for allowance and a Notice to that effect is earnestly solicited.

Early issuance of a Notice of Allowance is courteously solicited.

The Examiner is invited to telephone the undersigned, Applicant's attorney of record, to facilitate advancement of the present application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 07-1337 and please credit any excess fees to such deposit account.

Respectfully submitted,

LOWE HAUPTMAN HAM & BERNER, LLP

A handwritten signature in black ink that reads "Kenneth M. Berner". The signature is written in a cursive, slightly slanted style.

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